

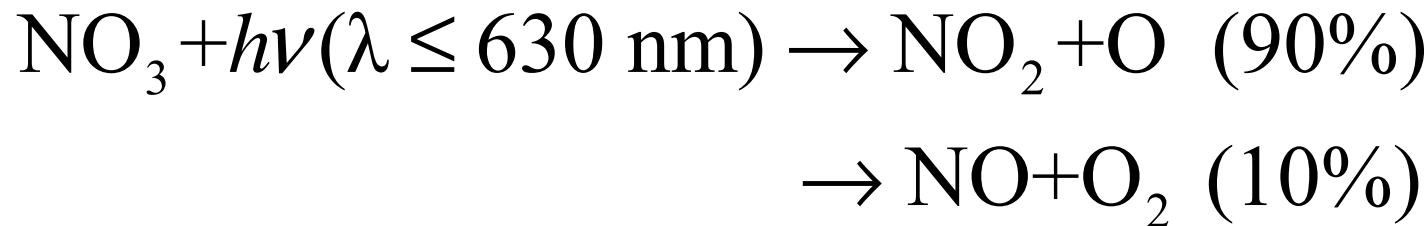
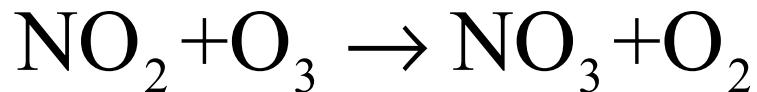
# **Diurnal Variability of the NO<sub>3</sub> Radical Using Ground-Based Lunar Occultation from Table Mountain, CA**



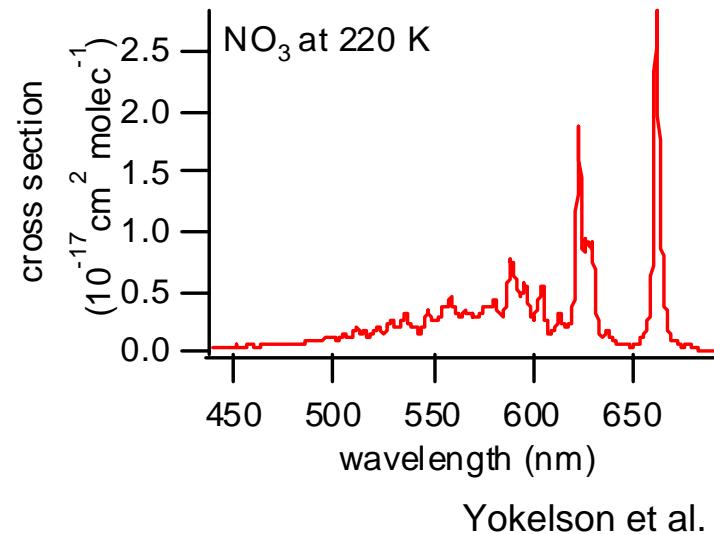
C. Chen, R. Cageao, S. Sander

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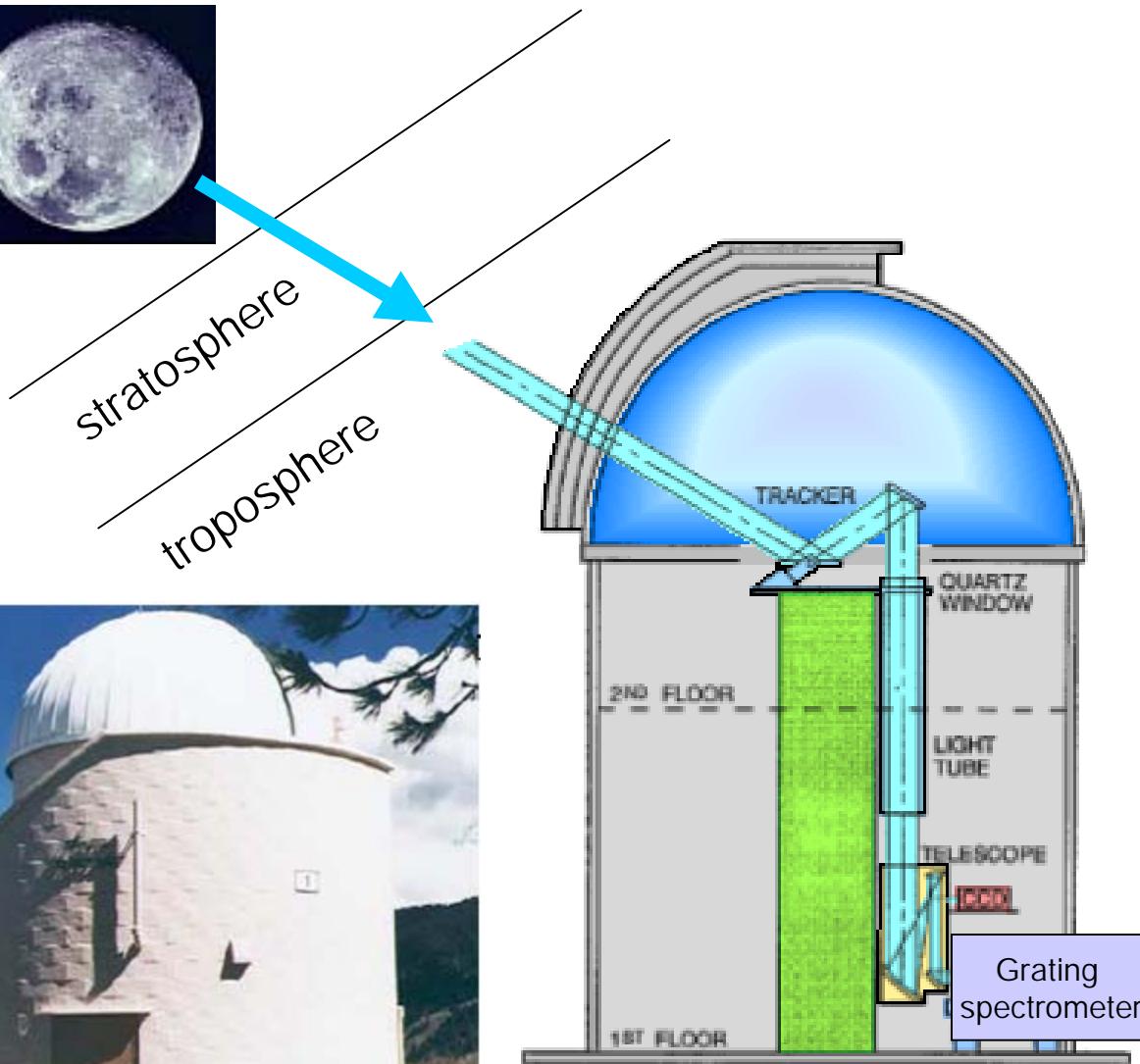
# $\text{NO}_3$ in $\text{NO}_x$ to $\text{NO}_y$ transformation



Rapid photodissociation  
means measurable quantities  
of  $\text{NO}_3$  only at night

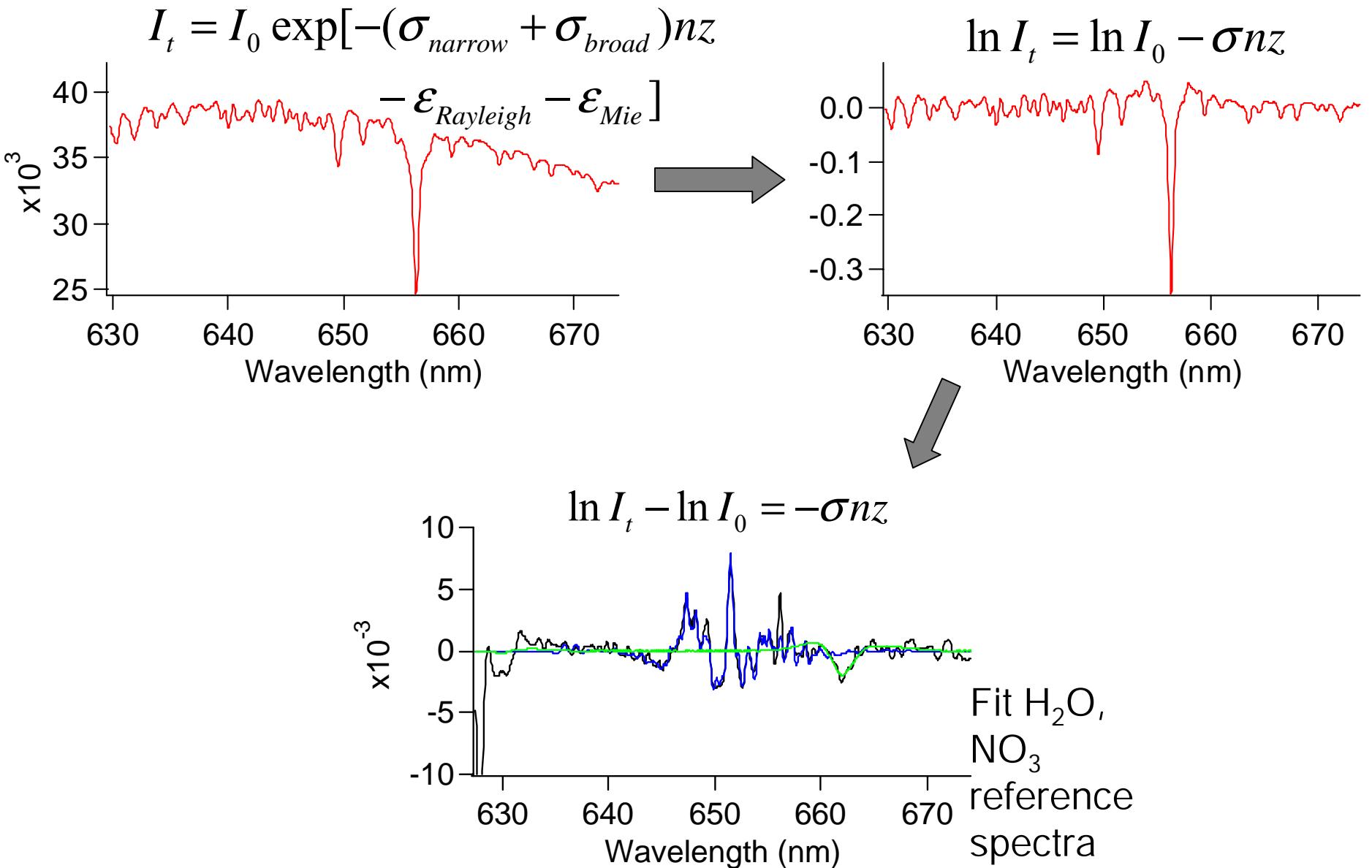


# Table Mountain dome and instruments



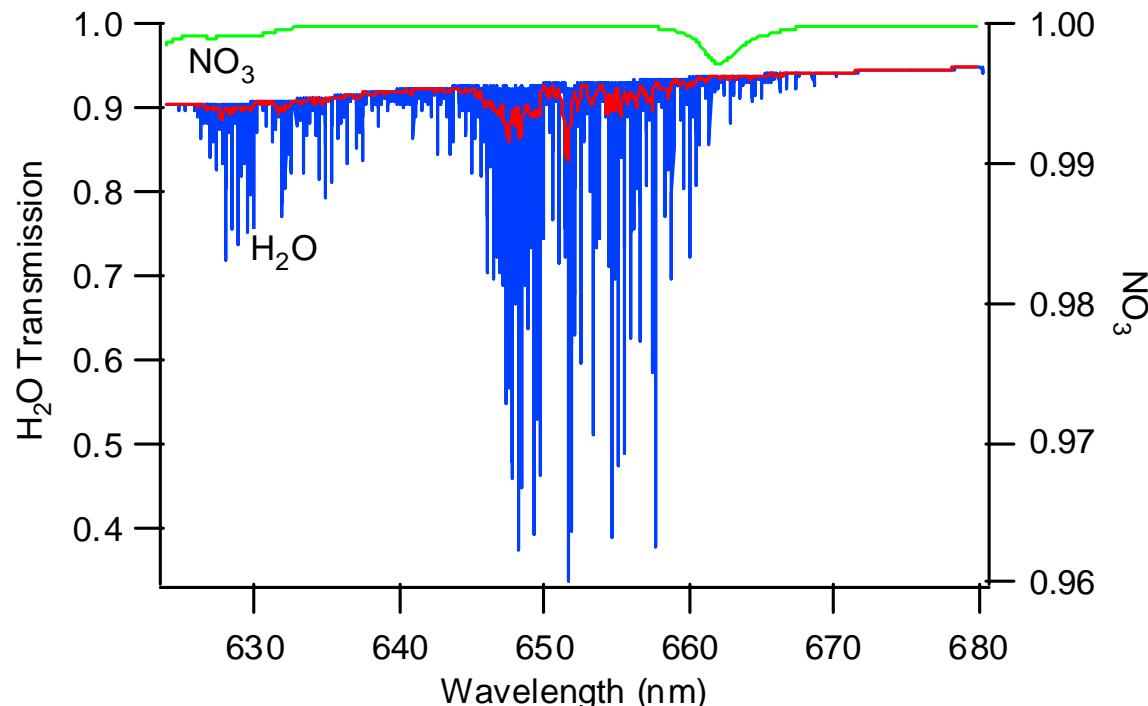
- 1024x256 pixel CCD
- 0.3 m grating spectrograph
- 0.3 nm resolution

# Data analysis procedure

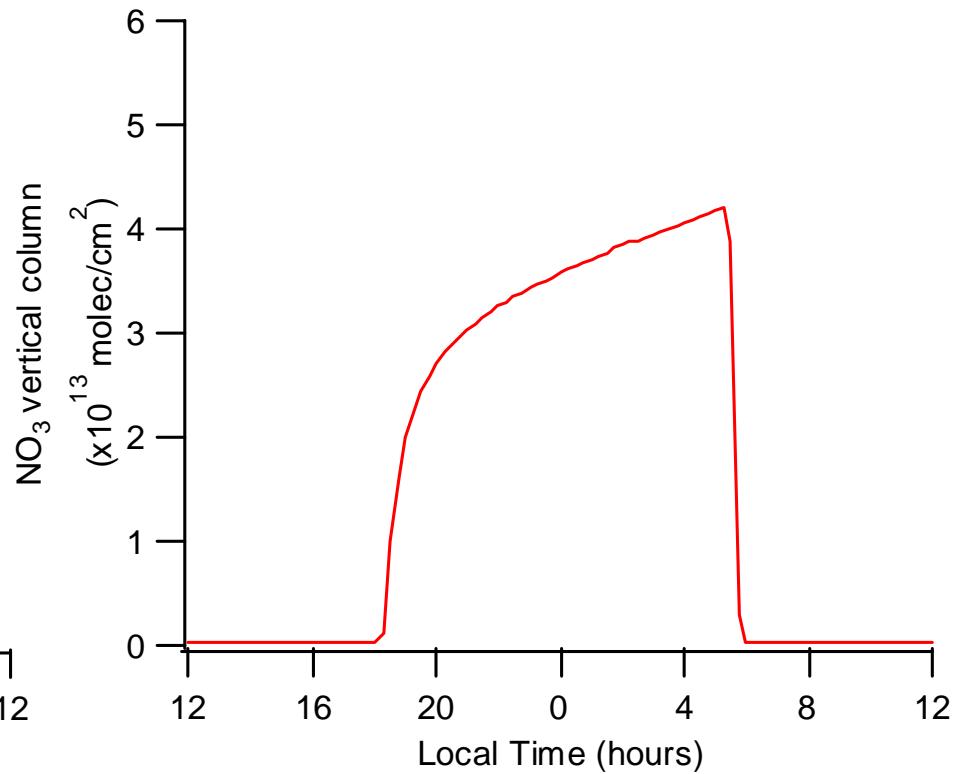
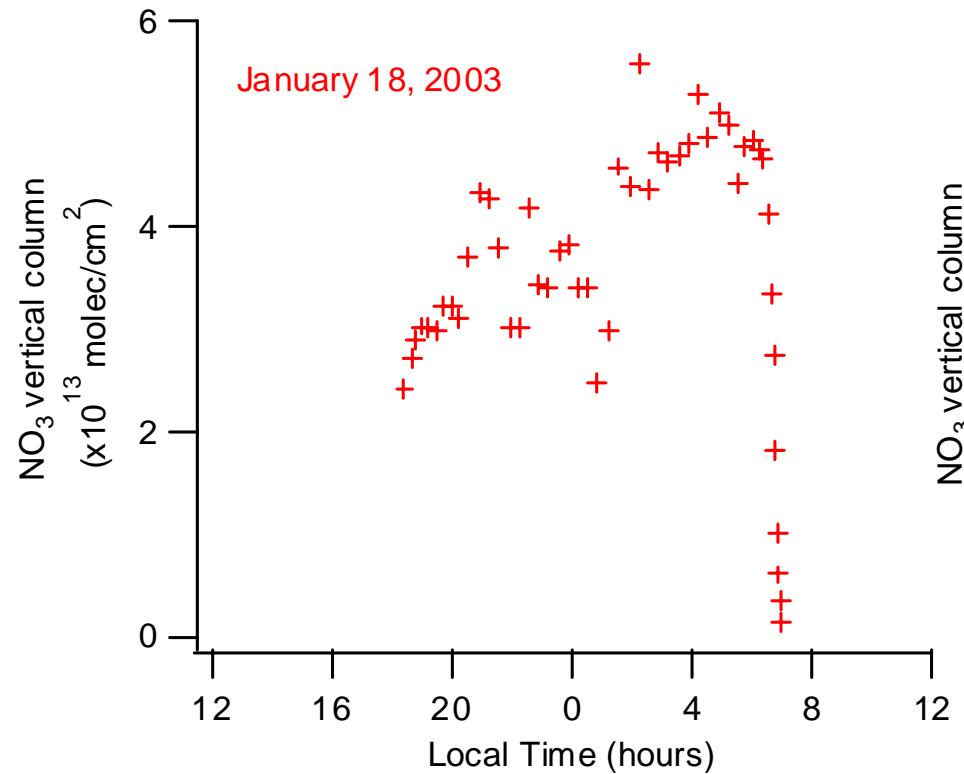


# Reference spectra

- Reference for solar features: lunar spectrum or solar spectrum, with diffuser or without diffuser?
- Water reference: simulated vs. atmospherically derived?

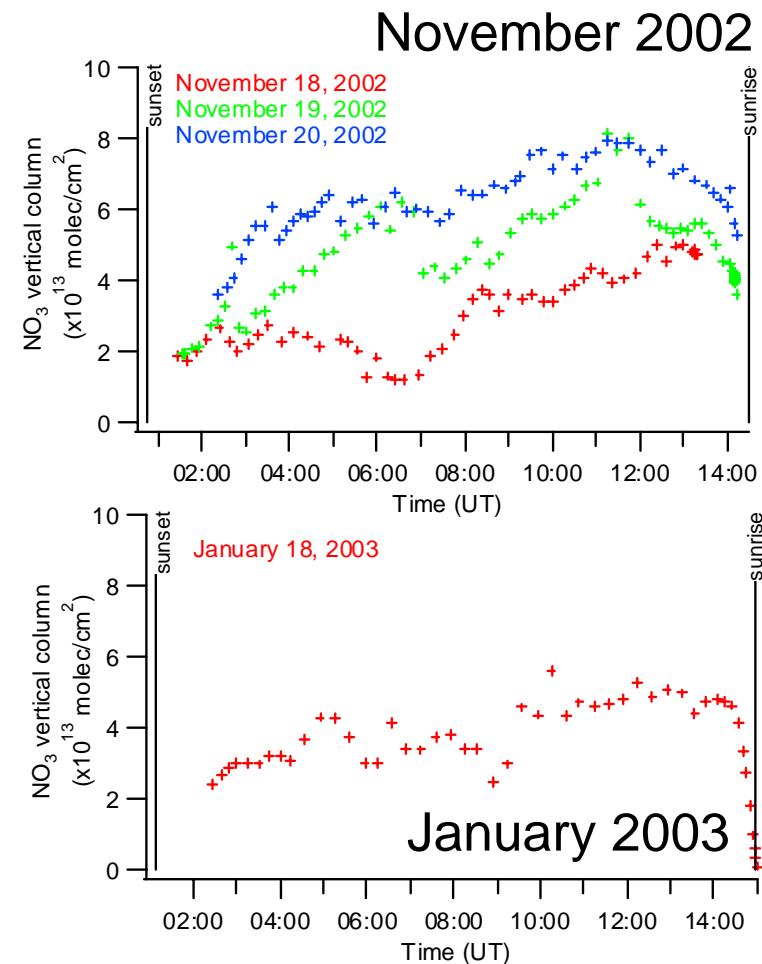
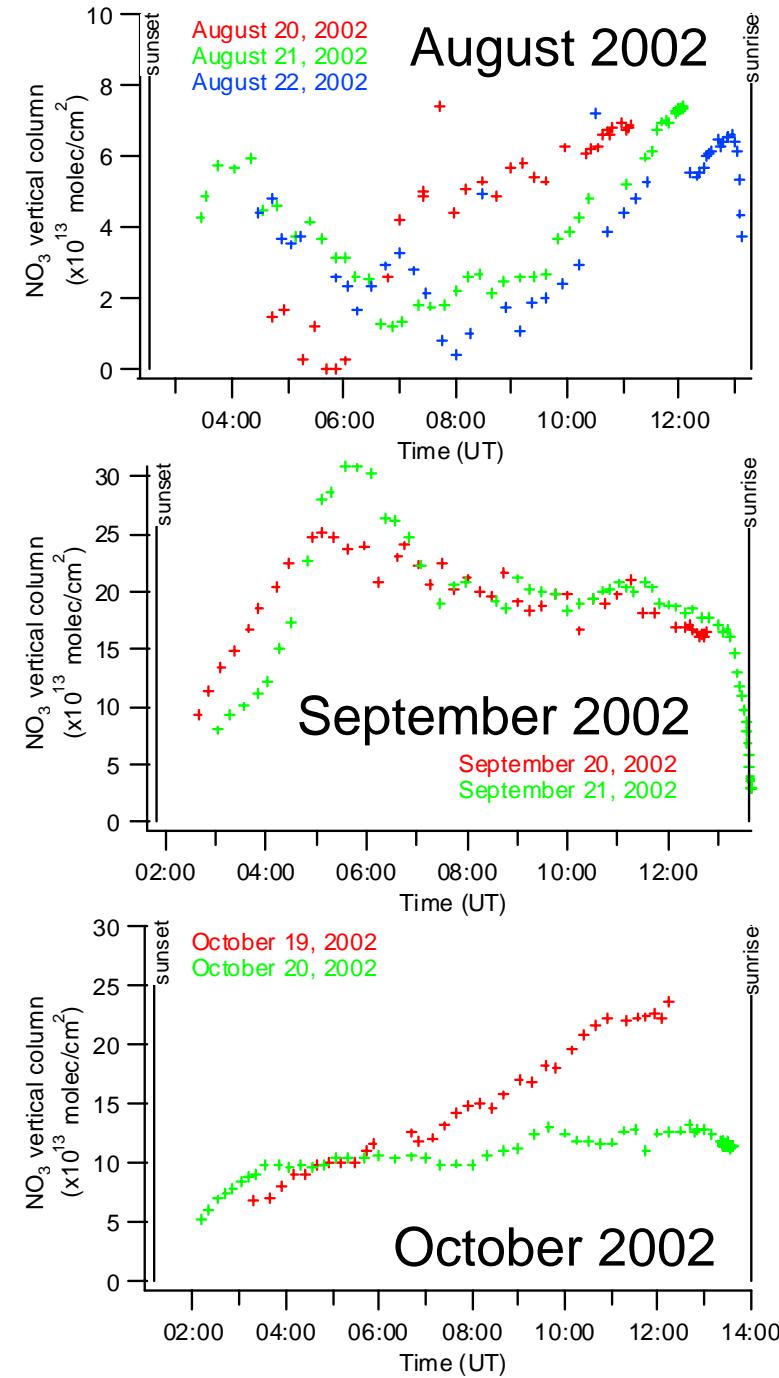


# $\text{NO}_3$ vertical column, solar reference spectra with different airmass

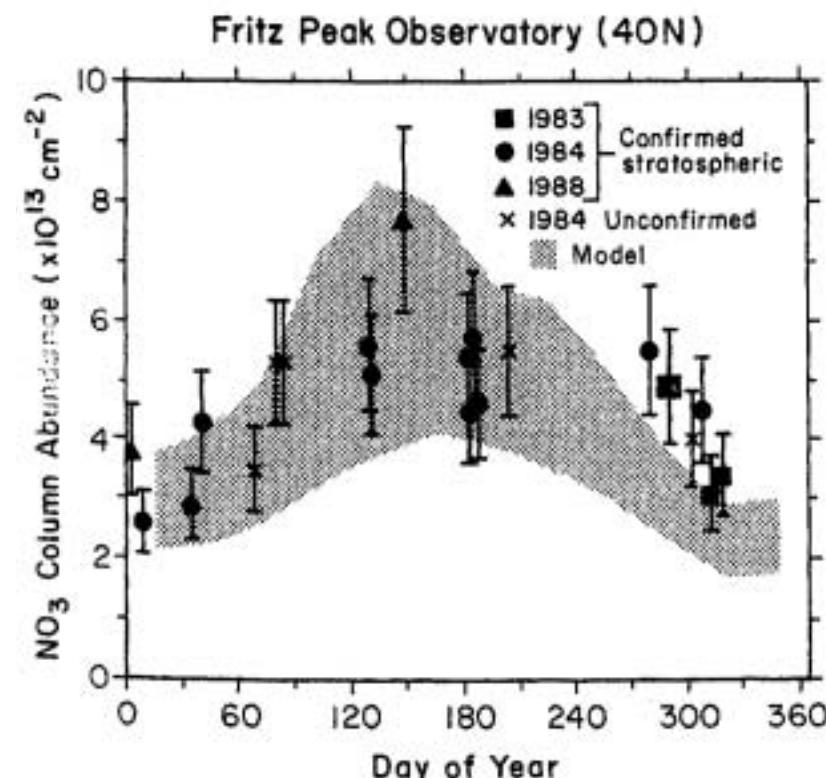
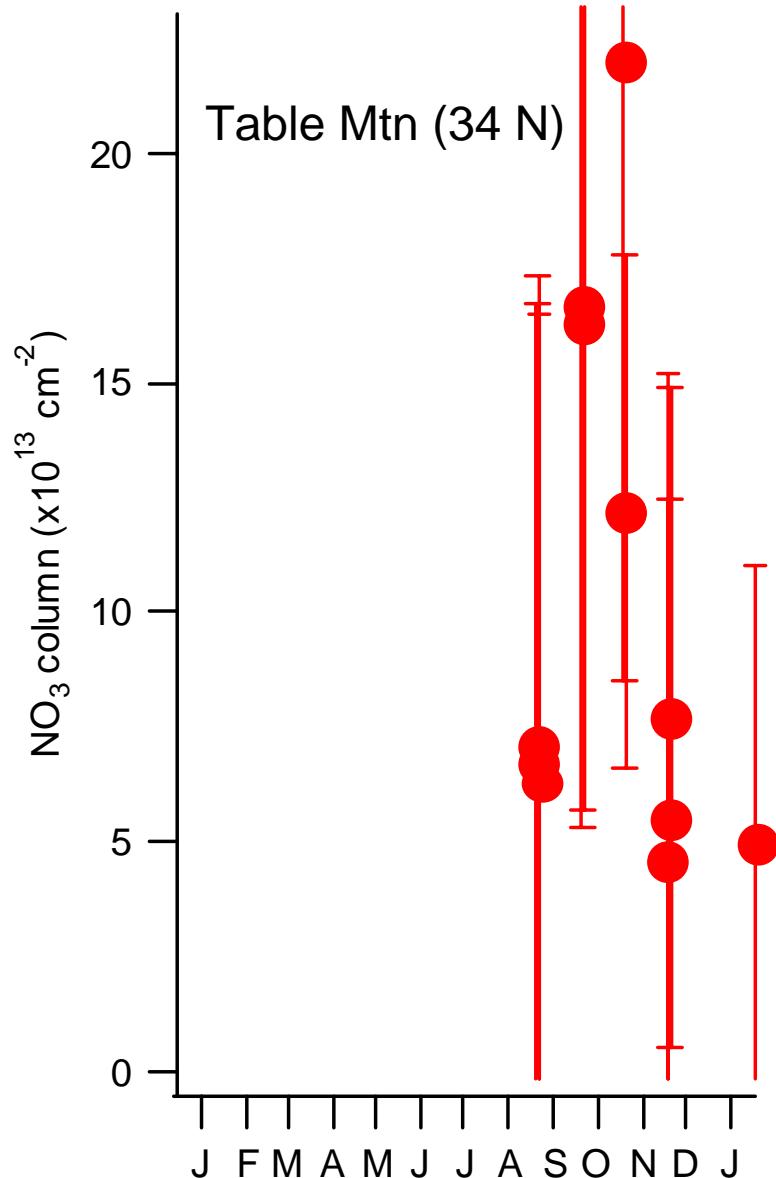


$\text{NO}_3$  model results using JPL 2000 kinetics,  
for 25 Sept 1993, 35 N  
courtesy of Ross Salawitch

# NO<sub>3</sub> column abundance



# $\text{NO}_3$ column, annual variability



# Summary and Conclusions

- $\text{NO}_3$  column abundance retrieved for five months, using atmospherically derived water reference, and daytime reference, with value just before sunrise ranging from  $6-22 \times 10^{13} \text{ cm}^{-2}$
- Retrieved column abundances are in agreement with preliminary model calculations of Salawitch and others, but there is a lot of variability. Some of this variability is likely tropospheric.

## Future work

- Analysis of the sensitivity of the  $\text{NO}_3$  column to kinetic parameters and  $\text{NO}_x$  variability on diurnal to seasonal time scales using a photochemical model.
- Simultaneous measurement of  $\text{NO}_3$  in boundary layer using long path DOAS instrument from UCLA
- Work with SAGE III science team to coordinate validation events
- Retrieval using 623 nm  $\text{NO}_3$  peak
- Retrieval using high resolution FTS instrument